AUSTIN ENERGY

PURCHASE SPECIFICATION

FOR

SWITCHGEAR,NETWORK,URD,3PH,1200-2000A,2400Y-1386V,INDOOR,METALCLAD,2.4KV SPOT NETWORK

DATE	PREPARED BY	ISSUANCE/REVISION	APPROVAL PROCESS SUPV. / MANAGER
10/04/95	George Martinez	Issuance	Peter G. Soosay
10/12/95	George Martinez	Revision	Peter G. Soosay

REASON FOR REVISION	AFFECTED PARAGRAPHS
Updating	1.1.2, 1.2.2, 4.11.1, 9.0, deleted 4.1.2

This specification, until rescinded, shall apply to each future purchase and contract for the commodity described herein.
Retain for future reference.

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FOR
SWITCHGEAR INDOOR METALCLAD
2.4 KV SPOT NETWORK

1.0 SCOPE AND CLASSIFICATION

1.1 Scope

1.1.1 The City of Austin requires a qualified supplier to provide 2.4 kV metalclad switchgear for use as a spot network. The Supplier shall follow this specification and the associated drawings precisely and shall seek clarification whenever necessary.

1.1.2 The switchgear furnished under these specifications shall be assembled in the continental United States by a domestic Supplier of switchgear, or if assembled elsewhere, proof of experience and compliance with ANSI standards must be provided with bid. Supplier must have a minimum of 5 years of experience. The circuit breakers and the circuit breaker cubicles shall be furnished by the same manufacturer or a certified O.E.M.

1.2 Classification

1.2.1 The switchgear will be used as a 2.4 kV spot network on a network distribution system.

1.2.2 All exceptions to this specification and the reasons for each exception shall be listed in writing and submitted with the bid. Non-conformance to the specification may result in bid rejection. All exceptions must be resolved in writing prior to the awarding of a contract to the successful bidder. After the contract is awarded no additional exceptions will be allowed.

2.0 APPLICABLE STANDARDS

The switchgear furnished under this specification shall conform to the latest NEMA, IEEE, ANSI/IEEE, ANSI, and ASTM standards applicable to metalclad power switchgear, power circuit breakers, instrument transformers, and other equipment covered in this specification. In the case of a conflict between any of the standards mentioned in this specification and the contents of this document, the City of Austin specification shall govern. The applicable standards shall include but not be limited to, the following:

2.1 ANSI/IEEE C37.04-1979 (Reaff 1988) Standard Rating Structure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis (Includes Supplement C37.04c-1985)

2.2 ANSI/IEEE C37.04f-1990 Supplement to ANSI/IEEE C37.04-1979

2.3 ANSI/IEEE C.37.06-1987 Standard for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis-Preferred Ratings and Related Capabilities

2.4 ANSI/IEEE C37.09-1979 (Reaff 1988) Standard Test Procedure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis

2.5 ANSI/IEEE C37.09e-1985 Supplement to ANSI/IEEE C37.09-1979

2.6 ANSI/IEEE C37.09g-1985 Draft Supplement to ANSI/IEEE C37.09-1979

2.7 ANSI/IEEE C37.1-1987 Standard Definition, Specification, and Analysis of Systems Used for Supervisory Control, Data Acquisition, and Automatic Control

2.8 ANSI/IEEE C37.2-1991 Draft Standard Electrical Power System Device Function Numbers

2.9 ANSI/IEEE C37.20.2-1987 Standard for Metal-Clad and Station Type Cubicle Switchgear

2.10 ANSI/IEEE C37.21-1985 Standard for Control Switchboards

2.11 ANSI/IEEE C37.23-1987 Standard for Metal-Enclosed Bus and

Calculating Losses in Isolated-Phase Bus

2.12 ANSI/IEEE C37.54-1987 Standard Conformance Test Procedures For Indoor Alternating-Current High-Voltage Circuit Breakers Applied as Removable Elements in Metal-Enclosed Switchgear Assemblies

2.13 ANSI/IEEE C37.55-1989 Standard Conformance Test Procedures for Metal-Clad Switchgear Assemblies

2.14 ANSI/IEEE C37.90-1987 Standard for Relays and Relay Systems Associated with Electric Power Systems

2.15 ANSI/IEEE C37.90.1-1989 Standard Surge Withstand Capability (SWC) Tests for Protective Relays and Relay System

2.16 ANSI/IEEE C37.100-1981 (Reaff 1989) Standard Definitions for Power Switchgear

2.17 ANSI/IEEE C37.100b-1986 Supplement to ANSI/IEEE C37.100-1981

2.18 ANSI/IEEE ClOOd-1990 Draft Supplement to ANSI/IEEE C37.100-1981

2.19 ANSI/IEEE C57.13-1978 (Reaff 1986) Standard Requirements for Instrument Transformers

2.20 ANSI/IEEE C57.13.2-1991 Conformance Test Procedures for Instrument Transformers

2.21 ANSI/IEEE C62.11-1987 Standard for Metal-Oxide Surge Arresters for AC Power Circuits

2.22 ANSI/IEEE Std 100-1984 IEEE Standard Dictionary for Electrical and Electronic Terms

2.23 ANSI/NFPA 70-1987 National Electrical Code

2.24 ANSI C2-1993 National Electric Safety Code

2.25 ANSI Z55.1-1967 (Reaff 1973) American National Standard Gray Finishes for Industrial Apparatus and Equipment

2.26 ANSI/IEEE Std 1-1986 Standard General Principles for Temperature

2.28 ASTM F855-83 Specification for Temporary Grounding Systems to be used on De-energized Electric Power lines and Equipment.

3.0 DESIGN

3.1 Functional Requirements

The switchgear will be used to provide six 2400Y/1386 Volt wye, 4 wire, solidly grounded neutral, 3 phase electric utility distribution circuits from the 2400Y/1386 Volt secondary of four (4) transformers. The functions that the switchgear will perform shall include, but not be limited to, the following:

a) Independent circuit on and off switching of each distribution

b) Fault protection for each distriution circuit.

c) Metering for each customer circuit.

3.2 Switchgear Ratings

<u>Circuit Breaker and Switchgear Ratings:</u>

Nominal voltage class, rms: 4.16 kV

Rated voltage class, rms:	5 kV
Nominal 3-Phase MVA class:	350 MVA
Rated frequency:	60 Hz
Rated continuous current:	1200 and 2000 Amp
Rated impulse withstand voltage:	60 kV peak
60 Hz withstand:	41 kV peak
Short circuit current rated maximum kV, rms:	41 kA
Voltage range factor, k:	1.19
Rated momentary closing and latching capability at 2.7 K times rated short circuit current (Ref: ANSI C37.06):	132 kA Crest
Three second short circuit rating	49 kA
Permissible tripping delay, Y:	2 Seconds
Rated interrupting times:	5 cycles
Heater circuit supply voltage:	120 VAC
Control circuit supply voltage:	120 VAC and capacitor trip devices

Service Conditions:

Temperature:	-30C to +60C
Humidity:	0% to 100%
Altitude:	Sea Level to 3300 feet above sea level

3.3 Bus Ratings

All bus shall be of a non-segregated design. All bus shall be designed, constructed, and tested in accordance with ANSI/IEEE C37.23-1987 and other applicable standards. All bus and bus duct shall be rated as follows:

Maximum operating voltage, rms:	5 kV
60 Hz withstand, peak:	19 kV
Impulse withstand, peak:	60 kV
Continuous current at 60 Hz, rms:	2000 Amps
Momentary current, Asym. rms:	78 kA

3.4 Power Source

This switchgear will be connected to four (4) transformers, each rated as follows:

Capacity	2000 kVA
Primary Voltage	34.5 kV delta
Secondary Voltage	2400Y/1386 V wye grnd. neut.
Primary BIL	200 kV
Secondary BIL	45 kV

4.0 CONSTRUCTION

4.1 General

4.1.1 The switchgear shall be designed with a total of 11 cubicles arranged in a single row. Four line side breaker cubicles, one tie breaker cubicle, and six feeder breaker cubicles shall be included. The breakers shall drawout horizontally.

4.2 Structural

4.2.1 The switchgear shall be constructed so that each cubicle is an individual shipping unit to facilitate installation. (Total of 11 cubicles.)

4.2.2 Each cubicle shall be built as an integral item complete with a frame heavy and rigid enough to maintain it true and square during shipping and installation.

4.2.3 The top of each cubicle shall be equipped with lifting eyes or a lifting bar to facilitate handling with a small overhead crane. Lifting points on the sides or bottoms of the cubicles are not acceptable. Each lifting bar shall include a 3"x 3" jack pad facing toward the front and rear of the cubicle.

4.2.4 The City of Austin will attach the switchgear assembly directly on a concrete slab floor utilizing lead expansion anchors and bolts.

4.2.5 Smooth steel plates shall be utilized for the switchgear floor, adequately supported to withstand moving the circuit breakers. All floor joints shall be smooth and even with the plates butted solidly together.

4.2.6 All cubicles shall be constructed with overall dimensions not to exceed 95 inches in height, 98 inches in depth and 36 inches in width.

4.2.7 Each cubicle shall be equipped with two hinged panels in front and a two-piece rear panel. The rear panels shall be approximately half the height of the cubicle and independently removable. External handles shall be provided on the rear panels for ease in removal and handling.

4.2.8 The circuit breaker shall be located in the lower half of the cubicle. The circuit breaker compartment shall be equipped to house the removable breaker element. The mechanism for levering the breaker shall be cell mounted and include all the necessary interlocks to render the breaker mechanism mechanically trip free during the levering procedure. A contact shall ground the breaker between and at the operating and test positions. Provide rails to allow withdrawal of each circuit breaker for inspection and maintenance without the use of a separate lifting device.

4.2.9 Cable entrance shall be from the bottom. Removable gland plates shall be provided, on the bottom for the installation of conduit.

4.2. 10 Relays and instruments shall be mounted on rigid formed hinged panels with hinges of sufficient strength to fully support the panel when open without sag. Hinged panels shall have 90 degrees turn handle draw-tight latches.

4.2.11 All doors shall open a minimum of 105 degrees and be equipped with doorstops.

4.2.12 Auxiliary tripping relays shall not be mounted on hinged panels. Relays should not operate as a result of circuit breaker motion or vibration.

4.2.13 Moving shutters shall cover the primary stationary contacts when the circuit breakers or potential transformer trays are moved from the operating to the disconnected position.

4.2.14 All metalwork shall be constructed of No.11 standard gauge steel or greater.

4.2.15 Except for CPT, all 2.4 kV voltages in the switchgear shall be separated from all lower voltages by a steel barrier.

4.3 Ventilation

4.3.1 Protected, filtered, rodent-proof ventilation openings shall be provided as required. The ventilation should be designed so that forced cooling is not required to maintain equipment rating.

4.3.2 Equipment heaters shall be provided in each cubicle, with one central thermostat control, to prevent condensation.

4.4 Circuit Breakers

4.4.1 The circuit breakers shall be Westinghouse VCP-W vacuum horizontal drawout type, capable of being withdrawn on rails. The breakers shall be operated by a motor-charged stored energy spring mechanism, charged normally by a universal electric motor and in an emergency by a manual handle. No other type of operating mechanism is acceptable. The primary disconnecting contacts shall be silver-plated copper.

4.4.2 Each circuit breaker shall contain three vacuum interrupters separately mounted in a self-contained, self-aligning pole unit which can be removed easily. The vacuum interrupter pole unit shall be mounted on glass polyester supports.

4.4.3 A contact wear gap indicator for each vacuum interrupter, which requires no tools to indicate available contact life, shall be easily visible when the breaker is removed from its compartment.

4.4.4 The current transfer from the vacuum interrupter moving stem to the breaker main conductor shall be a non-sliding design.

4.4.5 The breaker front panel shall be removable when the breaker is withdrawn for ease of inspection and maintenance.

4.4.6 The secondary contacts shall be silver-plated and shall automatically engage in the breaker operating position, which can be manually engaged in the breaker test position.

4.4.7 Interlocks shall be provided to prevent closing of a breaker between operating and test positions, to trip breakers upon insertion or removal from housing and to discharge stored energy mechanisms upon insertion or removal from the housing. The breaker shall be secured positively in the housing between and including the operating and test positions.

4.4.8 The circuit breakers shall be self-aligning and shall be rigidly held in the operating position without locking bars or bolts.

4.4.9 Circuit breakers shall be provided with a test position wherein the primary contacts are disengaged and the secondary contacts are engaged to allow testing of the mechanism and circuitry. A two-pole switch shall be provided with one contact closed to indicate the breaker is in the test position and the other contact shall close when the circuit breaker is fully engaged.

4.4. 10 Vacuum circuit breakers shall be provided with a minimum of four (4) spare "a" and four (4) spare "b" auxiliary contacts, wired to terminal blocks for future use.

4.4.11 Name plates shall be provided for all switches and major components in circuit breaker control enclosure.

4.4.12 Control and auxiliary switches shall have wiping type contacts. Roller type contacts are not acceptable.

4.4.13 All capacitor trip devices shall be per drawing 49-7-3304-CTD-1 (attachment II) and shall include a pushbutton and test light located on the front of the cubicle doors. Suppliers shall verify that capacitor sizing is adequate for use with manufacturer's trip coils to provide a minimum of two trip operations after loss of power.

4.4.14 The circuit breaker shall have a counter to register the number of breaker opens.

4.5 Bus

4.5.1 The main bus shall be copper and all taps shall be insulated with non-tracking flame retardant insulation. The main bus shall be continuously rated for 2000 amperes in accordance with ANSI standards for temperature rise. All bus shall be supported with porcelain insulating material. Aluminum bus bars are not acceptable.

4.5.2 All bus joints shall be silver-plated, insulated, and bolted with at least two stainless steel bolts with stainless steel flat washers on both head and nut and lockwashers. Bol ts shall be torqued to meet bus design strength for maximum short circuit forces. Provisions shall be made at the ends of the line-up for future extension of the buswork.

4.5.3 The main bus shall be braced to withstand the forces which result from the maximum short circuit current and/or the circuit breaker close and latch capability.

4.6 Boots

4.6.1 Molded boots shall be furnished for all buswork connections and all connections including, but not limited to PT's, CT's, terminations, entrance bushings, and the station service transformer.

4.6.2 Boots shall be of a split design, easily installed and removed from the buswork using snap fasteners, nylon nuts and bolts, etc. Taped joints and/or taped boots are not acceptable.

4.7 Ground Bus

4.7.1 A 1/4 inch by 2 inch copper ground bus shall extend the full length of the line up and shall be bolted to the metal of each housing. All joints shall be made with at least two (2) bolts.

4.7.2 Connectors shall be provided at each end, inside cubicles 1 and 11, for termination of 4/0 station ground stranded copper wire.

4.7.3 All circuit breaker and other equipment grounding devices shall be connected to the ground bus. A connector shall be provided in each cable termination cubicle for connecting cable shields and 250 MCM bare stranded neutral copper wire.

4.7.4 Sections of copper bar may be connected to form the ground bus. The term continuous means the bus shall be all copper and not have some other material, such as a steel cubicle wall, connected between two sections of the copper bus.

4.8 Terminations

4.8.1 Line side power cable and control wiring shall enter from the bottom of the switchgear. Load side power cable and meter wiring will exit switchgear from the bottom.

4.8.2 Four-hole NEMA pad bolted terminals shall be furnished for all power cable terminations.

4.8.3 Sufficient clearance shall be provided to install stress relief cones on all power cable. Cable supports shall be provided in rear of all incoming cable compartments.

4.8.4 Phases shall be labeled in each termination compartment.

4.9 Instrument Transformers

4.9.1 The standard location for the current transformers on the bus side and line side of the breaker units shall be front accessible to permit adding or changing current transformers without removing high voltage insulation connections. Shorting terminal blocks shall be furnished on the secondary of all the current transformers. All taps on multi-ratio current transformers shall be wired out to shorting terminal blocks accessible without removing circuit breaker or de-energizing equipment.

4.9.2 Current transformers shall be provided as indicated on the one-line diagram. These shall be mechanically rated to the momentary rating of the circuit breakers and shall be fully insulated for the rating of the switchgear.

4.9.3 Three (3) metering accuracy C.T.'s shall be provided in each of the four (4) incoming line cubicles (BI, B2, B3, and B4). These shall be provided for high burden with accuracy class 0.3 through B.9, rating factor 1.5 with a 1200:5 amp multi-ratio, Westinghouse SCV-D Type Cat# 6436C47HOl or approved equivalent. All other C.T.'s shall be Westinghouse SCV-D or approved equal with the following minimum relay accuracies:

Ratio	**Relay Accuracy**
1200:5 MR	C400
2000:5	C400
3000:5	C400

4.9.4 Potential transformers shall be drawout type with primary and secondary fuses and shall be of the ratios indicated on the one-line diagram.

4.9.5 Three (3) metering potential transformers, 1440 to 120 Volt, accuracy class 0.3 W,X,M,Y, connected Y-Y to the incoming service bus, fused with current limiting fuses and mounted on a drawout assembly shall be provided in cubicles 1 and 11.

4.9.6 Provide one spare set of fuses for each set of potential transformers.

4.10 Control Power Transformers and Automatic Transfer Switch

4. 10.1 A control power transformer and automatic transfer switch shall be supplied to furnish all necessary control and auxiliary power for the entire switchgear assembly if the preferred power source supplied by the City of Austin is lost. The automatic transfer switch shall provide for automatic or manual transfer capability.

4.10.2 Transformer shall be nonflammable dry type in a drawout enclosure with high voltage current limiting fuses. Supplier to provide two spare fuses.

4.10.3 The drawout enclosure shall be interlocked with a secondary breaker so that it cannot be opened unless the secondary breaker is in the open position.

4.10.4 Push-to-test indicating lamps shall be furnished on the cubicle panel front to indicate presence of voltage on each control power source and transfer switch position. In addition, one (1) control (27) relay with double-throw double-pole contacts shall be furnished and connected to each source to provide remote alarm or indication.

4.11 Wiring

4.11.1 All panel power, control or instrument transformer secondary wiring shall be GE Vulkene insulated switchboard wire 600 volt, 90C Sl-57275, type SIS VW-1, single conductor, grey color, minimum size #14 AWG 41 strand tinned copper or buyer approved equal, terminated with ring tongue insulated lugs. Fork tongue terminals are not acceptable. Insulation of the wire must abut the ring tongue terminal. All wiring from metering CT's and PT's to cubicle 1 shall be #10 AWG.

4.11.2 Wiring crossing hinges to hinged panels shall have fine stranding to prevent conductor breaking and shall be protected with sleeving to prevent abrasion.

4.11.3 Terminal blocks shall be rated for 600 V and 30 A per terminal. They shall accomodate wire sizes up to #10 gauge. All terminal blocks for external connections shall be completely free of factory wiring on City of Austin side of terminal block. Wiring to these terminal blocks shall be grouped according to function so as to allow a neat and orderly cable installation.

Terminal blocks shall include 25 percent spare terminals. Terminal blocks shall not be mounted on floor, subfloor, or ceiling plates.

4.11.4 All C.T. leads shall be terminated on C.T. shorting and grounding type terminal blocks with ring type insulated terminals. All leads from each C.T. shall be brought to the terminal blocks. Terminal blocks shall be accessible from the front of the switchgear assembly and not located in the high voltage compartments. All C.T. wye and delta connections shall be made at the terminal blocks.

4.11.5 All wiring of transducer outputs shall be with #16 AWG shielded cable. Shields shall be grounded at the signal source only.

4.11.6 All secondary control wiring passing through primary compartments shall be enclosed in grounded metal troughs or conduit. A separate rigid or flexible conduit shall be provided from cubicle 9 to cubicle 1 for metering C.T. and P.T. wiring.

4.11.7 Control power disconnects shall be provided for each circuit breaker.

4.11.8 Wiring between cubicles shall run from terminal board to terminal board in each cubicle. No splices shall be made in any wire.

4.11.9 All wiring shall be identified with captive permanent, clearly-marked wire tags. Tags shall be of heat shrink type material. Supplier shall furnish samples with approval drawings.

4.11.10 Marathon heavy duty keyless fuse blocks or equivalent shall be used. Pullout type fuse blocks are not acceptable.

4.11.11 Interconnect wiring shall be tagged, terminated, tested, then disconnected from both ends for shipment.

4.11.12 Supplier shall clearly identify all leads and terminal blocks intended for interconnections.

4.11.13 Provisions shall be made for the connection of future supervisory control. This shall include teminal block points for supervisory close, trip, network relay close blocking, circuit breaker and lockout relay status. These points shall all be grouped on the same or adjacent terminal blocks.

4.11.14 Alarm contacts shall be wired so that contact closing indicates an alarm condition.

4.11.15 One contact from each of the following shall be wired to to a terminal block in cubicle 6 for connection to an external annunciator.

1. Transformer lockout relays
2. Bus differential lockout relays
3. Transformer low side vacuum circuit breaker trip
4. Feeder circuit breaker trip
5. Loss of normal control power
6. Loss of backup control power

4.12 Finish

4. 12.1 The switchgear shall be painted ANSI No.70 light gray in accordance with ANSI Z55.1, inside and outside.

4.12.2 All metal surfaces shall be cleaned and shotblasted before applying the primer. Cleaning and painting shall be done in a manner which will prevent dust or other airborne particles from contaminating freshly painted surfaces.

4.12.3 Surfaces shall be free of cracks, pits, projections, or other imperfections which would prevent the formation of a smooth, unbroken paint film.

4.12.4 All paint in any one paint coat shall be hard and dry through the entire paint film before the next coat is applied. In no case shall the elapsed time between the application of successive coats of paint to any surface be less than that recommended by the paint manufacturer.

4.12.5 Two (2) coats of primer shall be applied to all exposed metal surfaces using application methods recommended by the paint manufacturer and shall be a minimum of two (2) mils in thickness.

4.12.6 The top finish thickness shall be at least three (3) mils in thickness at all points.

4.12.7 All primer and paint shall be lead-free.

4.13 Nameplates

4.13.1 The supplier shall furnish and install all name plates as shown on attachment I.

4. 13.2 The name plate material shall be laminated, phenol resin, 1/16" thick, semi-matte, black surfaces with white finish. The engraving shall cut through the black surface to the white lamination. Name plates shall be fastened to the metal with permanent adhesive. Door mounted name plates shall have a duplicate on the inside of the door.

4.13.3 The name plate lettering shall be Gothic, block type of standard sizes as shown on the name plate schedules.

4.13.4 Each circuit breaker shall have affixed a waterproof tag stating purchase order number, circuit breaker type, ratings, manufacturer, and shop order number.

4.13.5 Relay devices to which a device number is assigned shall have device number and relay type painted or otherwise indelibly and neatly marked on the rear of the case. (i.e. "51-A, Over-Current Relay", etc.)

4.13.6 Supplier shall label with @nt or otherwise identify each terminal block, all points used on each terminal block and all fuse blocks.

4. 14 Relays

4.14.1

Device	**Function**	**Type**
87T	Transformer Diff.	ABB CA
87B	Bus Diff.	ABB CA-16
51	Overcurrent	ABB CO-9, CO-11
92	Network Relay	ETI with RS485, socket type

4.14.2 All relays shall be provided with covers.

4.14.3 Miscellaneous devices essential to the successful operation of the switchgear shall be mounted on the inside of the cubicle, on swinging panels, if necessary, to provide accessibility for maintenance and repair.

4.14.4 Relays mounted inside the cubicle shall be front connected.

4.14.5 Auxiliary tripping relays shall be mounted solidly to stationary sheets or panels to avoid accidental trips. Such devices shall not be mounted on hinged panels.

4. 14.6 Relays, fuses, or terminal blocks shall not be mounted on cubicle ceilings.

4.14.7 All devices mounted inside the cubicle shall be above the drawout level of the breaker.

4.14.8 All small miscellaneous items not specified elsewhere shall be supplied, including fuse blocks, fuses, wiring duct, terminal blocks, name plates, resistors, capacitors, minilites and covers, etc., as shown on the drawings or required for a complete installation.

4.15 Cubicle Equipment Description

The following section provides a detailed description of the equipment in each cubicle. Where the supplier is allowed the option of furnishing either the ABB, General Electric, or other manufacturer's devices, the supplier shall remain consistent through all cubicles in the selection of devices.

4.15.1 Cubicle 1 - Feeder Cubicle I

Item	Qty	Description
1	3	Overcurrent Relays, Extremely Inverse 1 - 12A TOC, ABB CO-11 #265CO47AO5
2	1	Overcurrent Relay, Extremely Inverse, 0.5 - 2.5A TOC, ABB CO-11 #265CO47AOl
3	1	Digital meter, Electroindustries DWVA-300-H- KW-120VAC analog output module with SEFl-1 6 channel
4	1	Agastat Timing Relay, #7012PA
5	1	Meter Test Switch, 10 Pole, ABB Type FT-1, #129A514GOI
6	1	Breaker Control Switch, Electroswitch 2458D
7	1	Capacitor Trip Device per drawing 49-7-3304-CTD-1
8	2	Breaker Position Indicating Lights, GE Type ET-16, 120 Volt
9		Diode, IN4007 with MOV V250LA20B (as Required)
10		Trip Blocking Diode, ECG 5932 with MOV V250LA20B (as Required)

4.15.2 Cubicle 2 - Feeder Cubicle 2

Item	Qty	Description
1	3	Overcurrent Relays, Extremely Inverse I - 12A TOC, ABB CO-11 #265CO47AO5
2	1	Overcurrent Relay, Extremely Inverse, 0.5 - 2.5A TOC, ABB CO-11 #265CO47AOl
3	1	Digital meter, Electro industries DWVA-300-H-KW-120VAC analog output module with SEFl-16 channel
4	1	Agastat Timing Relay, #7012PA
5	1	Meter Test Switch, 10 Pole, ABB Type FT-1, #129A514GO1
6	1	Breaker Control Switch, Electroswitch 2458D

7	1	Capacitor Trip Device per drawing 49-7-3304-CTD-1
8	2	Breaker Position Indicating Lights, GE Type ET-16, 120 Volt

Diode, IN4007 with MOV V250LA20B (as Required)

10 Trip Blocking Diode, ECG 5932 with MOV V250LA20B (as required)

11	4	Push-to-test indicating lights for control power source and transfer switch position indication
12	2	Control relay, DPDT, 120 VAC for control power source monitoring
13	1	Automatic transfer switch (to be sized for total load of switchgear assembly)
14	2	One pole circuit breakers for isolation of control power sources

4.15.3 Cubicle 3 - Feeder Cubicle 3

Item	Otv	Description
1	3	Overcurrent Relays, Extremely Inverse 1 - 12A TOC, ABB CO-11 #265CO47AO5
2	1	Overcurrent Relay, Extremely Inverse, 0.5 - 2.5A TOC, ABB CO-11 #265CO47AOl
3	1	Digital meter, Electroindustries

DWVA-300-H-KW-120VAC
analog output module with SEFl-1 six channel

4	1	Agastat Timing Relay,	#7012PA
5	1	Meter Test Switch, #129A514GO1	10 Pole, ABB Type FT-1,
6	1	Breaker Control Switch, Electroswitch 2458D	
7	1	Capacitor Trip Device per drawing 49-7-3304-CTD-1	
8	2	Breaker Position Indicating Lights, GE Type ET-16, 120 Volt	

Diode, IN4007 with MOV V250LA20B (as Required)

10		Trip Blocking Diode, ECG 5932 with MOV V250LA20B (as required)

4.15.4 Cubicle 4 - Transformer I

Item	Oty	Description
1	3	Transformer Differential Relay, ABB Type CA #29OB893AO9
2	1	Lockout Relay, 125 VDC Electroswitch 7804D
3	2	Coil and Sudden Pressure Monitor Lamps, GE Type ET-16, 120 Volt
4	3	Overcurrent Rel ay, Very Inverse I - 12A TOC, No IOC, ABB Type CO-9 #264C90IAO5
5	1	Overcurrent Relay, Very Inverse 0.5 - 2.5A TOC, No IOC, ABB Type CO-9 #264C901AOl
6	1	Digital meter, Electroindustries DWVA-300-H-KW-120VAC with SEFl-1 6 channel analog output module
7	1	Meter Test Switch, 10 Pole, ABB Type FT-1, 129A514GOI
8	2	Agastat Timing Relay, CAT. 7012 PA
9	2	Breaker Control Switch, Electroswitch 2458D
10	4	Breaker Position Indication Lights, GE Type ET-16, 125 Volt
11	2	Network Relay, ETI with RS485 board, socket type (1 spare)
12		Diode IN4007 with MOV V250LA20B (as required)
13		Trip Diode, ECG 5932 with MOV V250LAOB (as required)
14	1	Trip Test Switches, ABB Type FT-1, 129A501GOI
15	2	Capacitor Trip Device per Drawing 49-7-3304-CTD-1

4.15.5 Cubicle 5 - Transformer 2

Item	Qty	Description
1	3	Transformer Differential Relay, ABB Type CA #29OB893AO9
2	1	Lockout Relay, 125 VDC Electroswitch 7804D
3	2	Coil and Sudden Pressure Monitor Lamps, GE Type ET-16, 120 Volt
4	3	Overcurrent Relay, Very Inverse 1 - 12A TOC, No IOC, ABB Type CO-9 #264C901AO5
5	1	Overcurrent Relay, Very Inverse 0.5 - 2.5A TOC, No IOC, ABB Type CO-9 #264C901AOl
6	1	Digital meter, Electroindustries

DWVA-300-H-KW-120VAC
analog output module with SEFI-1 6 channel

7	1	Meter Test Switch, 10 Pole, ABB Type FT-1, 129A514GOI
8	2	Agastat Timing Relay, CAT. 7012 PA
9	2	Breaker Control Switch, Electroswitch 2458D
10	4	Breaker Position Indication Lights, GE Type ET-16, 125 Volt
11	2	Network Relay, ETI with RS485, socket type (1 spare)

12 Diode IN4007 with MOV V250LA20B (as required)

13 Trip Diode, ECG 5932 with MOV required)

V250LAOB (as

14	2	Trip Test Switches, ABB Type FT-1, 129A501GO1
15	3	Capacitor Trip Device per Drawing 49-7-3304-CTD-1

16 3 Bus Differential Relays, ABB Type CA-16
#67lBl57A20

17 1 Lockout Relay, 125 VDC, Electroswitch 7805D

4.15.6 Cubicle 6 - Bus Tie Breaker

Item	Oty	Description
1	2	Voltmeter, Electroindustries 3DVA120-H SNFl-1 4 channel analog output module
2	3	Overcurrent Relay, Very Inverse 1 - 12A No IOC, ABB Type CO-9 #264C901AO5
3	1	Overcurrent Relay, Very Inverse 0.5 - TOC, No IOC, ABB Type CO-9 #24C901AOl
4	1	Digital meter, Electroindustries

DWVA-300-H-KW-120VAC
analog output module wi th SEFI-1 with TOC, 2. 5A 6 channel

5	1	Meter Test Switch, 129A514GO1	10 Pole, ABB Type FT-1,
6	1	Meter Test Switch, 10 129A501GO1	Pole, ABB Type FT-1
7	1	Breaker Control Switch, Electroswitch 2458D	
8	2	Breaker Position Indication Lights, GE Type ET-16, 125 Volt	
9		Diode IN4007 with MOV V250LA20B (as required)	

10 2 Capacitor Trip Device per Drawing
49-7-3304-CTD-1

4.15.7 Cubicle 7 - Transformer 3

Item	Oty	Description
1	3	Transformer Differential Relay, ABB Type CA #29OB893AO9
2	1	Lockout Relay, 125 VDC Electroswitch 7804D

3	2	Coil and Sudden Pressure Monitor Lamps, GE Type ET-16, 120 Volt
4	3	Overcurrent Relay, Very Inverse 1 - 12A TOC, No IOC, ABB Type CO-9 #264C901AO5
5	1	Overcurrent Relay, Very Inverse 0.5 - 2.5A TOC, No IOC, ABB Type CO-9 #264C901AOI
6	1	Digital meter, Electroindustries DWVA-300-H-KW-120VAC with SEFl-1 6 channel analog output module
7	1	Meter Test Switch, 10 Pole, ABB Type FT-1, 129A514GO1
8	2	Agastat Timing Relay, CAT. 7012 PA
9	2	Breaker Control Switch, Electroswitch 2458D
10	4	Breaker Position Indication Lights, GE Type ET-16, 125 Volt
11	2	Network Relay, ETI with RS485 board, socket type (1 spare)

12 Diode IN4007 with MOV V250LA20B (as required)

13 Trip Diode, ECG 5932 with MOV V250LAOB (as required)

14 2 Trip Test Switches, ABB Type FT-1, 129A501GO1

15 3 Capacitor Trip Device per Drawing 49-7-3304-CTD-1

16 3 Bus Differential Relays, ABB Type CA-16 #67lBl57A20

17 1 Lockout Relay, 125 VDC, Electroswitch 7805D

4.15.8 Cubicle 8 - Transformer 4

Item		Description
1	3	Transformer Differential Relay, ABB Type CA #29OB893AO9
2	1	Lockout Relay, 125 VDC Electroswitch 7804D

3	2	Coil and Sudden Pressure Monitor Lamps, GE Type ET-16, 120 Volt
4	3	Overcurrent Relay, Very Inverse 1 - 12A TOC, No IOC, ABB Type CO-9 #264C90IAO5
5	1	Overcurrent Relay, Very Inverse 0.5 - 2.5A TOC, No IOC, ABB Type CO-9 #264C901AOl
6	1	Digital meter, Electroindustries

DWVA-300-H-KW-120VAC
analog output module with SEFl-1 6 channel

7	1	Meter Test Switch, 10 Pole, ABB Type FT-1, 129A514GO1
8	2	Agastat Timing Relay, CAT. 7012 PA
9	2	Breaker Control Switch, Electroswitch 2458D
10	4	Breaker Position Indication Lights, GE Type ET-16, 125 Volt
11	2	Network Relay, ETI with RS485 board, socket type (I spare)
12		Diode IN4007 with MOV V250LA20B (as required)
13		Trip Diode, ECG 5932 with MOV V250LAOB (as required)
14	1	Trip Test Switches, ABB Type FT-1, 129A501GO1
15	2	Capacitor Trip Device per Drawing 49-7-3304-CTD-1

4.15,Z Cubicle 9 - Feeder Cubicle 4

Item	Qty	Description
1	3	Overcurrent Relays, Extremely Inverse 1 - 12A TOC, ABB CO-11 #265CO47AO5
2	1	Overcurrent Relay, Extremely Inverse, 0.5 - 2.5A TOC, ABB CO-11 #265CO47AOl
3	1	Digital meter, Electroindustries

DWVA-300-H-KW-120VAC analog output module with SEFl-16 channel

4	1	Agastat Timing Relay,	#7012PA
5	1	Meter Test Switch, #129A514GOI	10 Pole, ABB Type FT-1,
6	1	Breaker Control Switch, Electroswitch 2458D	
7	1	Capacitor Trip Device per drawing 49-7-3304-CTD-1	
8	2	Breaker Position Indicating Lights, GE Type ET-16, 120 Volt	
·		Diode, IN4007 with MOV V250LA20B (as required)	
10		Trip Blocking Diode, ECG 5932 with MOV V250LA20B (as required)	

4.15.10 Cubicle 10 - Feeder Cubicle 5

Item	Oty	Description
1	3	Overcurrent Relays, Extremely Inverse 1 - 12A TOC, ABB CO-11 #265CO47AO5
2	1	Overcurrent Relay, Extremely Inverse, 0.5 - 2.5A TOC, ABB CO-11 #265CO47AOl
3	1	Digital meter, Electroindustries

DWVA-300-H-KW-120VAC analog output module with SEFl-1 6 channel

4	1	Agastat Timing Relay,	#7012PA
5	1	Meter Test Switch, #129A514GO1	10 Pole, ABB Type FT-1,
6	1	Breaker Control Switch, Electroswitch 2458D	
7	1	Capacitor Trip Device per drawing 49-7-3304-CTD-1	
8	2	Breaker Position Indicating Lights, GE Type ET-16, 120 Volt	

· Diode, IN4007 with MOV V250LA20B (as required)

10 Trip Blocking Diode, ECG 5932 with MOV V250LA20B (as required)

4.15.11 Cubicle 11 - Feeder Cubicle 6

Item	Oty	Description
1	3	Overcurrent Relays, Extremely Inverse I - 12A TOC, ABB CO-11 #265CO47AO5
2	1	Overcurrent Relay, Extremely Inverse, 0.5 - 2.5A TOC, ABB CO-11 #265CO47AOl
3	1	Digital meter, Electroindustries

DWVA-300-H-KW-120VAC analog output module with SEFl-1 6 channel

4	1	Agastat Timing Relay, #7012PA
5	1	Meter Test Switch, 10 Pole, ABB Type FT-1, #129A514GO1
6	1	Breaker Control Switch, Electroswitch 2458D
7	1	Capacitor Trip Device per drawing 49-7-3304-CTD-1
8	2	Breaker Position Indicating Lights, GE Type ET-16, 120 Volt

· Diode, IN4007 with MOV V250LA20B (as required)

10 Trip Blocking Diode, ECG 5932 with MOV V250LA20B (as required)

5.0 ACCESSORIES

The switchgear manufacturer shall furnish accessories for test, inspection, maintenance, and operation, including:

A ground and test device for use in any circuit breaker cubicle to permit testing or grounding of the bus and line circuits. The device is to be mounted on a frame that can be easily rolled in and out of the circuit breaker cubicles.

Maintenance tool for manually charging the breaker closing spring and manually opening the shutter

Levering crank for moving the breaker between test and connected positions

Test jumper for electrically operating the breaker while out of its compartment

Breaker lifting yoke used for attachment to breaker for lifting breaker on or off compartment rails

Set of rail extensions and rail clamps

"Dockable" transport dolly for moving breaker about outside its compartment

Test cabinet for testing electrically operated breakers outside housing

Ramp for rolling breaker mounted in lower compartment directly onto the floor

Electrical levering device

6.0 INSPECTION AND TESTING

6.1 General

The City of Austin reserves the right to visit the manufacturing facility and observe the switchgear and circuit breakers undergoing construction and testing. Advance notice of at least two (2) weeks shall be given to The City of Austin before the start of testing.

6.2 Factory Testina

The fully assembled switchgear line-up shall be tested in accordance with ANSI/IEEE C37.54-1987 and ANSI/IEEE C37.09-1979 for the circuit breakers and ANSI/IEEE C37.55-1989 and ANSI/IEEE C37.20.2-1987 for the switchgear before shipment. Five copies of certified test reports shall be furnished before shipment.

6.3 Field Testing

The Supplier shall provide personnel and equipment to field inspect and test each circuit breaker for proper operation. The supplier's service personnel shall inspect units per the manufacturer's recommendations, including the following as a minimum:

(1) Check interrupters, operating mechanism, and current transformers for loose hardware, correct alignment, and proper operation.

(2) Test vacuum bottles for dielectric strength

(3) Check all bus joints and supports for tightness

The successful bidder shall mail a copy of all test reports within ten (10) days after completion of tests.

7.0 DRAWINGS

7.1 The following drawings will be furnished to the Supplier as part of these specifications:

(1) Capacitor trip device (drawing 49-7-3304-CTD1)

(2) Relay one-line diagram (drawing 49-7-2591-RI)

(3) Switchgear layout with nameplate schedule (drawing 49-7-2591-LI)

(4) Nameplate schedules

(5) Typical control schematics (to be given to successful bidder)

7.2 The Supplier shall furnish to City of Austin Engineer three sets of approval drawings within ten (10) weeks after the receipt of the order and prior to beginning construction of the switchgear. The drawings shall include but not be limited to the following:

(1) Switchgear three-line AC and DC schematics including alarm contacts

(2) Switchgear internal wiring diagram

(3) One-line drawing showing size and location of control and power conduit entrance plates

(4) Excitation and ratio correction factor curves for all current transformers

(5) Interrupting duty for each feeder circuit breaker

(6) Switchgear material schedule

(7) Nameplate information

All drawings shall be 24" x 36". A minimum of two (2) weeks are required by the City of Austin for review of approval drawings.

The Supplier shall furnish five (5) sets of "as built" electrical control drawings in addition to one set on AutoCad version 12 (or later) on 5 1/4" or 3 1/2" disk prior to shipment of the switchgear.

The Supplier shall furnish complete installation, operating, and maintenance instruction books for each of the switchgear components and each relay and control device bound in 8 1/2" x 11" light weight folders suitable for reference and filing (five copies) with the paticular model supplied, clearly noted on documents that apply to more than one type or model . A spare parts I i st with prices and catalog numbers shall also be provided.

In addition to the above supplied instruction books, one (1) set of instruction books, complete with "as built" drawings, shall be packed with the metal-clad switchgear when shipped. The Supplier shall ship these documents in weatherproof packaging.

All drawings and coorespondence, after crontract award, shall be directed to:

City of Austin Electric Utility,
George Martinez, Supervisor of Distribution Engineering,
4411-B Meinardus Drive,
Austin, Texas 78744.

8.0 DELIVERY

8.1 The apparatus shall be shipped in assembly units, insofar as consistent with good shipping practices. When items must be disassembled for shipment, they shall be matchmarked. All units and their containers shall be piece marked and show the purchase order number.

8.2 Machined and other unpainted surfaces shall be fully protected from impact and weather damage with all holes and openings plugged or covered. All costs of packing, loading, blocking, and unloading are to be borne by the Supplier. Delivery shall be made to the job site.

8.3 Cubicles shall be shipped in two cubicle units with cubicle 11 as a one cubicle unit. Circuit breakers will be shipped separately. Supplier shall provide detailed instructions for field assembly.

8.4 Final acceptance of the work supplied under this specification shall be rendered when the following conditions have been met:

(1) Delivery requirements as specified have been met.

(2) Instruction book requirements as specified have been met.

(3) Sufficient tests and inspections have been made by the purchaser to determine that the work meets all the requirements of the specification and any written agreements between the City of Austin and the Supplier. The conditions of any tests shall be mutually agreed upon by the City of Austin and Supplier and the Supplier shall be notified of and may be represented at all tests made. If inspection and/or tests show the work or any part thereof not to be warranted and/or contracted for, the City of Austin may

refuse to accept it, and the Supplier shall be so advised and shall have a reasonable time within which to correct the work at the Supplier's own expense.

8.5 The City of Austin shall be given 48 hours of advanced notice of intent to deliver. If proper notice of intent to deliver is not received, then the shipment will be rejected. Any additional charges due to the refusal of the shipment will be the responsibility of the Supplier.

9.0 WARRANTY

If any defect in the apparatus supplied, or failure to comply with said specification, shall appear within the period of one (1) year from the energization of the equipment or a maximum of eighteen (18) months from the date of final acceptance of the work, the Supplier shall be immediately notified, and Supplier shall thereupon correct without delay and at Supplier's own expense the defect or defects of failure of compliance, by repairing the defective part or parts, by supplying a non-defective replacement or replacements, or by correcting a defective or deficient design. Supplier shall further replace or repair all other similar equipment if such defect may reasonably be expected to develop or occur in said similar equipment. Removal and installation cost of the defective parts or equipment shall be at the Supplier's expense. In the event the Supplier must correct any defect or defects or failure of compliance by repair, replacement or correction as hereinabove provided then with respect to the apparatus corrected, the aforesaid period shali begin from the date of completion of installation of such correction and acceptance thereof, provided same is not unreasonably delayed by the City of Austin. This warranty provision is in addition to and not in lieu of any other warranties or rights the City of Austin may have.

ATTACHMENT I

NAMEPLATE SCHEDULES
Attachment I
page I of 11

STEPHEN F. AUSTIN BUILDING

INDOOR METALCLAD SWITCHGEAR
CUBICLE 1 NAMEPLATE SCHEDULE

NP#	First Line	Second Line	Third Line
1	Cubicle 1	Feeder 1	
2	Feeder 1	Breaker Metering	
3	Circuit Breaker	Cap. Trip Device	Test
4	Feeder I	Circuit Breaker	Control
5	Feeder I	Meter	Test Switch
6	Feeder I	Overcurrent	51 PA
7	Feeder 1	Overcurrent	51 PB
8	Feeder 1	Overcurrent	51 PC
9	Feeder 1	Overcurrent	51N

Nameplate #1 is 1" x 4" with 3/8" Letters
All Others Are 3/4" x 2 1/2" with 5/32" Letters
All Nameplates Are Black With White Letters

NP# First Line

STEPHEN F. AUSTIN BUILDING

INDOOR METALCLAD SWITCHGEAR
CUBICLE 2 NAMEPLATE SCHEDULE

1 Cubicle 2
2 Feeder 2
3 Circuit Breaker
4 Feeder 2
· Feeder 2
6 Feeder 2
7 Feeder 2
8 Feeder 2
· Feeder 2
10 Automatic Transfer
11 Automatic Transfer
12 Network Grid
13 Control Power

Second Line

Feeder 2
Breaker Metering
Cap. Trip Device
Circuit Breaker
Meter and Transducer
Overcurrent
Overcurrent
Overcurrent
Overcurrent
Switch
Switch
Power
Transformer

Nameplate #1 is I" x 4" with 3/8" Letters
All Others Are 3/4" x 2 1/2" with 5/32" Letters
All Nameplates Are Black With White Letters

Attachment I
page 2 of 11

Third Line

Test
Control
Test Switch
51 PA
51 OB
51 PC
5IN
Normal
Emergency
Available
Available

Attachment I
page 3 of 11

STEPHEN F. AUSTIN BUILDING

INDOOR METALCLAD SWITCHGEAR
CUBICLE 3 NAMEPLATE SCHEDULE

NP#	First Line	Second Line	Third Line
1	Cubicle 3	Feeder 3	
2	Feeder 3	Breaker Metering	
3	Circuit Breaker	Cap. Trip Device	Test
4	Feeder 3	Circuit Breaker	Control
5	Feeder 3	Meter	Test Switch
6	Feeder 3	Overcurrent	51 PA
7	Feeder 3	Overcurrent	51 PB
8	Feeder 3	Overcurrent	51 PC
9	Feeder 3	Overcurrent	5IN

Nameplate #1 is 1" x 4" with 3/8" Letters
All Others Are 3/4" x 2 1/2" with 5/32" Letters
All Nameplates Are Black With White Letters

Attachment I
page 4 of 11

STEPHEN F. AUSTIN BUILDING

INDOOR METALCLAD SWITCHGEAR
CUBICLE 4 NAMEPLATE SCHEDULE

NP#	First Line		Second Line	Third Line
1	Cubicle 4		Transformer 1	
2	Transformer I		Differential	87Tl OA
3	Transformer I		Differential	87Tl OB
4	Transformer I		Differential	87TI OC
5	Transformer 1		Low Side Circuit	Breaker Metering
6	Transformer 1		Sudden Pressure	Temperature Trip
7	Transformer 1		High Side Switch	Sl Control
8	Transformer 1		Lockout	86Tl
9	Transformer I		Low Side Breaker	Control
10	Transformer 1		Lockout Cap. Trip	Device Test
11	Transformer 1		LS Breaker Cap. Trip	Device Test
12	Transformer I		Lockout Trip	Test Switch
13	Transformer 1		Low Side Metering	Test Switch
14	Transformer 1	LS	Breaker Overcurrent	5lTl PA
15	Transformer 1	LS	Breaker Overcurrent	5lTl OB
16	Transformer I	LS	Breaker Overcurrent	5lTl PC
17	Transformer 1	LS	Breaker Overcurrent	5lTlN
18	Transformer 1		LS Breaker Network	Relay 92TI

Nameplate #1 is I" x 4" with 3/8" Letters

All Others Are 3/411 x 2 1/2" with 5/32" Letters
All Nameplates Are Black With White Letters

NP#

First Line

Cubicle 5

Transformer	2
Transformer	2
Transformer	2
Transformer	2
Transformer	2
Transformer	2
Transformer	2
Transformer	2
Transformer	2
Transformer	2
Transformer	2
Transformer	2
Transformer	2
Transformer	2
Transformer	2
Transformer	2
Transformer	2
Bus	1
Bus	1
Bus	1
Bus	I
Bus	1
Bus	1
Bus	1

STEPHEN F. AUSTIN BUILDING
INDOOR METALCLAD SWITCHGEAR
CUBICLE 5 NAMEPLATE SCHEDULE

Second Line

Transformer 2
Differential
Differential
Differential
Low Side Circuit
Sudden Pressure
High Side Switch
Lockout
Low Side Breaker
Lockout Cap. Trip
LS Breaker Cap. Trip
Lockout Trip
Low Side Metering
LS Breaker Overcurrent
LS Breaker Overcurrent
LS Breaker Overcurrent
LS Breaker Overcurrent
LS Breaker Network
Differential Lockout
Differential
Differential
Differential
Differential Cap. Tri
Differential Lockout
Differential Lockout

Nameplate #1 is 1" x 4" with 3/8" Letters
All Others Are 3/4" x 2 1/2" with 5/32" Letters
All Nameplates Are Black With White Letters

Attachment I
page 5 of 11

Third Line

87T2 PA
87T2 OB
87T2 PC

Breaker Metering
Temperature Trip
S2 Control
86T2
Control
Device Test
Device Test
Test Switch
Test Switch
5lT2 PA
5lT2 PB
5lT2 PC
5lT2N
Relay 92T2
86Bl
87Bl PA
87BI PB
87Bl PC
Device Test
Trip Test Switch A
Trip Test Switch B

NP#

First Line

Cubicle 6

	Bus	1
	Bus	2
Bus	Tie	Breaker
Bus	Tie	Breaker
Bus	Tie	Breaker
Bus	Tie	Breaker
Bus	Tie	Breaker
Bus	Tie	Breaker
Bus	Tie	Breaker
Bus	Tie	Breaker

Voltmeter

STEPHEN F. AUSTIN BUILDING

INDOOR METALCLAD SWITCHGEAR
CUBICLE 6 NAMEPLATE SCHEDULE

Second Line

Bus Tie Breaker
Voltage
Voltage
Amps
Cap. Trip Device
Control
Meter/Transducer
Overcurrent
Overcurrent
Overcurrent
Overcurrent
Transducer Test Switch

Nameplate #1 is 1" x 4" with 3/8" Letters
All Others Are 3/4" x 2 1/2" with 5/32" Letters
All Nameplates Are Black With White Letters

Attachment I
page 6 of 11

Third Line

Test

Test Switch
51 PA
51 OB
51 PC
51N

Attachment I
page 7 of 11

STEPHEN F. AUSTIN BUILDING

INDOOR METALCLAD SWITCHGEAR
CUBICLE 7 NAMEPLATE SCHEDULE

NP#	First Line	Second Line	Third Line
1	Cubicle 7	Transformer 3	
2	Transformer 3	Differential	87T3 PA

3	Transformer	3		Differential	87T3 PB
4	Transformer	3		Differential	87T3 PC
5	Transformer	3		Low Side Circuit	Breaker Metering
6	Transformer	3		Sudden Pressure	Temperature Trip
7	Transformer	3		High Side Switch	S3 Control
8	Transformer	3		Lockout	86T3
9	Transformer	3		Low Side Breaker	Control
10	Transformer	3		Lockout Cap. Trip	Device Test
11	Transformer	3		LS Breaker Cap. Trip	Device Test
12	Transformer	3		Lockout Trip	Test Switch
13	Transformer	3		Low Side Metering	Test Switch
14	Transformer	3	LS	Breaker Overcurrent	5lT3 PA
15	Transformer	3	LS	Breaker Overcurrent	5lT3 OB
16	Transformer	3	LS	Breaker Overcurrent	5lT3 PC
17	Transformer	3	LS	Breaker Overcurrent	5lT3N
18	Transformer	3		LS Breaker Network	Relay 92T3
19	Bus 2			Differential Lockout	86B2
20	Bus 2			Differential	87B2 PA
21	Bus 2			Differential	87B2 PB
22	Bus 2			Differential	87B2 PC
23	Bus	2		Differential Cap. Tri	Device Test
24	Bus	2		Differential Lockout	Trip Test Switch A
25	Bus	2		Differential Lockout	Trip Test Switch B

Nameplate #1 is 1" x 4" with 3/8" Letters

All Others Are 3/4" x 2 1/2" with 5/32" Letters
All Nameplates Are Black With White Letters

NP#

First Line

Cubicle 8	
Transformer	4
Transformer	4
Transformer	4
Transformer	4
Transformer	4
Transformer	4
Transformer	4
Transformer	4
Transformer	4
Transformer	4
Transformer	4

Transformer 4
Transformer 4
Transformer 4
Transformer 4
Transformer 4
Transformer 4

STEPHEN F. AUSTIN BUILDING

INDOOR METALCLAD SWITCHGEAR
CUBICLE 8 NAMEPLATE SCHEDULE

Second Line

Transformer 4
Differential
Differential
Differential
Low Side Circuit
Sudden Pressure
High Side Switch
Lockout
Low Side Breaker
Lockout Cap. Trip
LS Breaker Cap. Trip
Lockout Trip
Low Side Metering
LS Breaker Overcurrent
LS Breaker Overcurrent
LS Breaker Overcurrent
LS Breaker Overcurrent
LS Breaker Network

Nameplate #1 is I" x 4" with 3/8" Letters
All Others Are 3/411 x 2 1/2" with 5/32" Letters
All Nameplates Are Black With White Letters

Attachment I
page 8 of 11

Third Line

87T4 PA
87T4 OB
87T4 PC
Breaker Metering
Temperature Trip
S4 Control
86T4
Control
Device Test
Device Test
Test Switch
Test Switch
5lT4 PA
5lT4 OB
5IT4 PC
5lT4N
Relay 92T4

NP#

First Line

Cubicle 9
Feeder 4
Circuit Breaker
Feeder 4
Feeder 4
Feeder 4
Feeder 4
Feeder 4
Feeder 4

STEPHEN F. AUSTIN BUILDING

INDOOR METALCLAD SWITCHGEAR
CUBICLE 9 NAMEPLATE SCHEDULE

Second Line

Feeder 4
Breaker Metering
Cap. Trip Device
Circuit Breaker
Meter and Transducer
Overcurrent
Overcurrent

Overcurrent
Overcurrent

Nameplate #1 is 1" x 4" with 3/8" Letters
All Others Are 3/4" x 2 1/2" with 5/32" Letters
All Nameplates Are Black With White Letters

Attachment I
page 9 of 11

Third Line

Test
Control
Test Switch
51 PA
51 OB
51 PC
51N

NP#

First Line

Cubicle 10
Feeder 5
Circuit Breaker
Feeder 5
Feeder 5
Feeder 5
Feeder 5
Feeder 5
Feeder 5

STEPHEN F. AUSTIN BUILDING

INDOOR METALCLAD SWITCHGEAR
CUBICLE 10 NAMEPLATE SCHEDULE

Second Line

Feeder 5
Breaker Metering
Cap. Trip Device
Circuit Breaker
Meter and Transducer
Overcurrent
Overcurrent
Overcurrent
Overcurrent

Nameplate #1 is 1" x 4" with 3/8" Letters
All Others Are 3/4" x 2 1/2" with 5/32" Letters
All Nameplates Are Black With White Letters

Attachment I
page 10 of 11

Third Line

Test
Control
Test Switch
51 PA
51 OB
51 PC
51N

NP#

First Line

Cubicle 11
Feeder 6
Circuit Breaker
Feeder 6
Feeder 6
Feeder 6
Feeder 6
Feeder 6
Feeder 6

STEPHEN F. AUSTIN BUILDING

INDOOR METALCLAD SWITCHGEAR
CUBICLE 11 NAMEPLATE SCHEDULE

Second Line

Feeder 6
Breaker Metering
Cap. Trip Device
Circuit Breaker
Meter and Transducer
Overcurrent
Overcurrent
Overcurrent
Overcurrent

Nameplate #1 is 1" x 4" with 3/8" Letters
All Others Are 3/4" x 2 1/2" with 5/32" Letters
All Nameplates Are Black With White Letters

Attachment I
page 11 of 11

Third Line

Test
Control
Test Switch
51 PA
51 OB
51 PC
51N

ATTACHMENT II

DRAWING 49-7-3304-CTDI

120 V.AC

R2

Dl

D D2

1

Si

Rl

ci

3

125 V.DC

Cl- CAPACRTOR, ELECTROLYTIC. 1200uf, 40OV.DC

Dl-4- DIODES, 12 AMP., 60OV., IN 1206A OR EQURVAL-ENT

Ll- LAMP, NEON.. 1/2 WATT, 125V.DC, 95V. BREAKDOWN VOLTAGE, CM2W 5100-832 BASE. NE51H

Rl- RESISTOR, VARLABLE. 5000A 50 WATT., SET AT 4000n

R2- RESISTOR, 15A 50 WATT

Sl- SWITCH, PUSHBUTRON., MOMENTARY WFTH ONE MAKE AND ONE BREAK CONTACT., 125V.DC

NOTES:

1) LAMP Ll AND SWITCH Sl WILL BE PANEL MOUNTED FOR EASY ACCESS FOR TESTING.

REVISED 6-15-93

C'ity of Aust'in

room
@ W-

INDOOR METALCLAD
SWFTCHGEAR
CAPACITOR TRIP DEVLCE

49-7-3304-CTD1

ATTACHMENT III

DRAWING 49-7-2591-Rl

(24" X 36" SHEET)

AND

ATTACHMENT IV

DRAWING 49-7-2591-Ll

(24" X 36" SHEET)